

Mapping the Landscape of Bibliometric Research in India: A Bibliometric Analysis

Hafijull Mondal^{1*} and Sujay Kumar Das²

¹PhD Research Scholar, DLIS, Netaji Subhas Open University, Kolkata, West Bengal, India

²Library Professional Trainee, Central Library, IIT Kharagpur, West Bengal, India

*Corresponding Author. Email: hafijullmondal@gmail.com

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Abstract

Bibliometric research, a crucial method for understanding scientific productivity and research trends, has increasingly gained attention in India over the past decade. The present study investigates publications characteristics and trends in bibliometrics research in India using bibliometric methods. The findings aim to map the intellectual landscape of bibliometric research in India and identify emerging trends and gaps for future exploration.

This study aims to provide a comprehensive bibliometric analysis of bibliometric research in India from 2015 to 2024, utilizing data from the OpenAlex database as of July 2024. The research encompasses 3,166 articles, focusing on annual publication trends, key contributors, influential institutions, and prominent journals.

Methodologically, the study involved retrieving bibliometric data using keywords related to "bibliometric analysis" and refining the dataset to articles in English specifically from India. Data analysis was performed using the Bibliometrix package in R-Studio and Vosviewer software, enabling detailed scientific mapping and visualization of publication trends, prolific authors, influential institutions, and leading journals.

The findings reveal a substantial increase in annual scientific production, with a notable surge in articles peaking at 963 in 2023. This suggests a period of rapid expansion potentially influenced by increased funding and evolving research policies. The analysis also identifies diverse journals contributing to the field, with significant contributions from the DESIDOC Journal of Library & Information Technology and other notable sources. Key institutions such as Symbiosis International University, Chandigarh University and Malaviya National Institute of Technology Jaipur emerged as major contributors. Trend topics highlight a growing focus on systematic literature reviews, future research agendas, and emerging fields like artificial intelligence.

The practical implications of this research lie in its ability to guide future bibliometric studies and research policy by identifying trends and influential institutions. The study's originality lies in its detailed examination of the bibliometric landscape in India, offering valuable insights into the evolving dynamics of research activity and collaboration within the country.

Keywords: *Bibliometric analysis, Bibliometric research, India, OpenAlex, Scientific productivity, Citation analysis.*

2. Introduction

Bibliometric research, a crucial method for understanding scientific productivity and research trends, has increasingly gained attention in India over the past decade. This study aims to provide a comprehensive bibliometric analysis of bibliometric research in India from 2015 to 2024, utilizing data from the OpenAlex database as of July 2024. By examining 3,166 articles, this research seeks to uncover annual publication trends, identify key contributors and influential institutions, and highlight prominent journals within the field. Methodologically, the study involves the systematic retrieval and refinement of bibliometric data using keywords related to "bibliometric analysis," with a focus on articles published in English from India. The analysis employs advanced tools such as the Bibliometrix package in R-Studio and Vosviewer software for detailed scientific mapping and visualization. This study not only reveals significant growth in bibliometric research output in India but also provides valuable insights into the evolving dynamics of research activity and collaboration within the country.

2. Literature Review

Bibliometric analysis has become an indispensable tool in the evaluation and mapping of scientific research. Originating in the early 20th century, the field of bibliometrics was revolutionized by Eugene Garfield with the creation of the Science Citation Index (SCI) in the 1960s. This innovation enabled the quantitative assessment of research impact through citation analysis, thereby transforming the way scientific contributions are measured and understood (Garfield, 1979). Bibliometric methods are now established as scientific specialties and are integral in research evaluation methodology, especially in scientific and applied fields (Thelwell, 2008). The field has seen a shift

towards interdisciplinary approaches, with researchers from various disciplines such as mathematics, computer science, sociology, psychology and management contributing to studies in bibliometrics. The focus of Bibliometric studies has shifted towards non-informational parameters of science, leading to the evolution of bibliometrics as a distinct scientific discipline with specific research profiles and sub-fields (Gupta, 2014). At present the time has come for bibliometricians engage in fruitful exchange of ideas with an objective of promoting research culture in the areas of quantitative studies in library and information science including the quantitative studies of science in general and particularly of science policy, science programmes and science administration, socio-economic and educational culture of the nations(H. Mondal, 2021).

India's research landscape has experienced substantial growth, especially in the last two decades, driven by increased funding, policy initiatives, and investments in higher education and research infrastructure. This period has seen a significant rise in research output, international collaboration, and the establishment of India as a notable contributor to global scientific literature.

Early bibliometric studies in India focused on specific disciplines, analysing publication output and citation patterns. For instance, Kumar and Garg (2005) investigated the research output in physics and chemistry, highlighting an upward trend in publications and growing international collaborations. Similarly, (D. Mondal, 2020) India placed 11th rank having 4.6% contribution and Indian scientists published total 9,823 research articles including 50.98% international collaboration. The Physical Review D (PRD) journal published majority of Indian authored articles.

The scope of bibliometric research has expanded over the years. Gupta and Dhawan (2020) conducted a comprehensive analysis of Indian research output, documenting significant growth in publications and citations across various fields. This study also underscored the increasing collaboration between Indian and international researchers, which has been a critical factor in the enhanced visibility and impact of Indian research.

In more recent studies, (Pradhan and Sahu, 2018) provided a bibliometric analysis of Indian research in computer science, identifying trends in authorship, collaboration, and citation patterns. Their findings highlighted the growing importance of interdisciplinary research and the pivotal role of collaborative efforts in advancing scientific knowledge. (Keshri & Tigga, 2020) extended this analysis to medical research, documenting a substantial increase in both the quantity and quality of publications from India, reflecting the countries strengthened research capabilities and infrastructure in the medical sciences.

Despite these advances, a gap exists in the literature regarding a detailed and longitudinal analysis of bibliometric research output in India over the past decade. Previous studies have often been limited to specific disciplines or time frames, lacking a comprehensive view of trends across a broad spectrum of bibliometric research areas and institutions .

The present study aims to fill this gap by providing a comprehensive bibliometric analysis of bibliometrics research trends, prolific authors, influential institutions, and prominent journals in the field of bibliometric research in India. By doing so, it will contribute to a deeper understanding of the dynamics driving research productivity and collaboration in India, and help identify areas for future research and policy development.

3. Objective of the Study

The primary objective of this study is:

- To evaluate the Growth Trends in Bibliometric Research
- To identify Key Sources of Bibliometric Research
- To assess Institutional Contributions and Affiliations
- To examine Trend Topics in Bibliometric Research
- To analyse the Collaboration Network in Bibliometric Research

4. Methodology

Data for this study was collected from the OpenAlex database in July 2024, focusing on research articles published between 2015 and 2024. Initially, a search was conducted using keywords related to "bibliometric analysis," resulting in 54,598 documents. To refine this dataset, the search was limited to articles published in English and pertaining specifically to bibliometric analysis, with a focus on research articles from India, yielding a final set of 3,166 articles.

The bibliographic data was exported in WoS (.txt) file format for further analysis. The Bibliometrix package (version 4.1.3) was then used within the R-Studio environment (version 4.3.2), utilizing the Biblioshiny application for comprehensive analysis. Biblioshiny, known for its intuitive interface and extensive functionalities, was employed to conduct scientific mappings and generate various analyses and visualizations. Additionally, Vosviewer software was used for data visualization, providing further insights into publication trends, prolific authors, influential institutions, and prominent journals in the field of bibliometric research in India.

5. Results and Quantitative Analysis

5.1. Annual Scientific Production of Bibliometric Research 2015-2024

The table shows the annual scientific production of bibliometric research in India from 2015 to 2024, measured by the number of articles published each year. From 2015 to 2020, the number of articles increased gradually, starting with 78 articles in 2015 and rising to 203 articles by 2020. This steady growth indicates a consistent interest and investment in bibliometric research during these years. A significant surge is observed in 2021, with the number of articles almost doubling from the previous year to 402, followed by further increases to 538 articles in 2022 and peaking at 963 articles in 2023. This rapid expansion suggests heightened research activity, possibly due to increased funding, interest, or new policies and incentives.

5.2. Most Relevant Sources of Bibliometric Research in India 2015-2024

The table highlights the most relevant sources of bibliometric research in India from 2015 to 2024, listing the number of articles published in each source. Following this, the DESIDOC Journal of Library & Information Technology has published 46 articles, making it the first most significant source. The journal Sustainability comes next with 41 articles. The journal Scientometrics has contributed 37 articles to the field.

Further down the list, the International Journal of Research in Library Science has published 31 articles, and the Indian Journal of Information Sources and Services has 27 articles. The TÜRK BILGISAYAR VE MATEMATİK EĞİTİMİ DERGİSİ has published 26 articles, the Journal of Business Research has 24 articles, and the Asian Journal of Information Science and Technology rounds out the list with 22 articles.

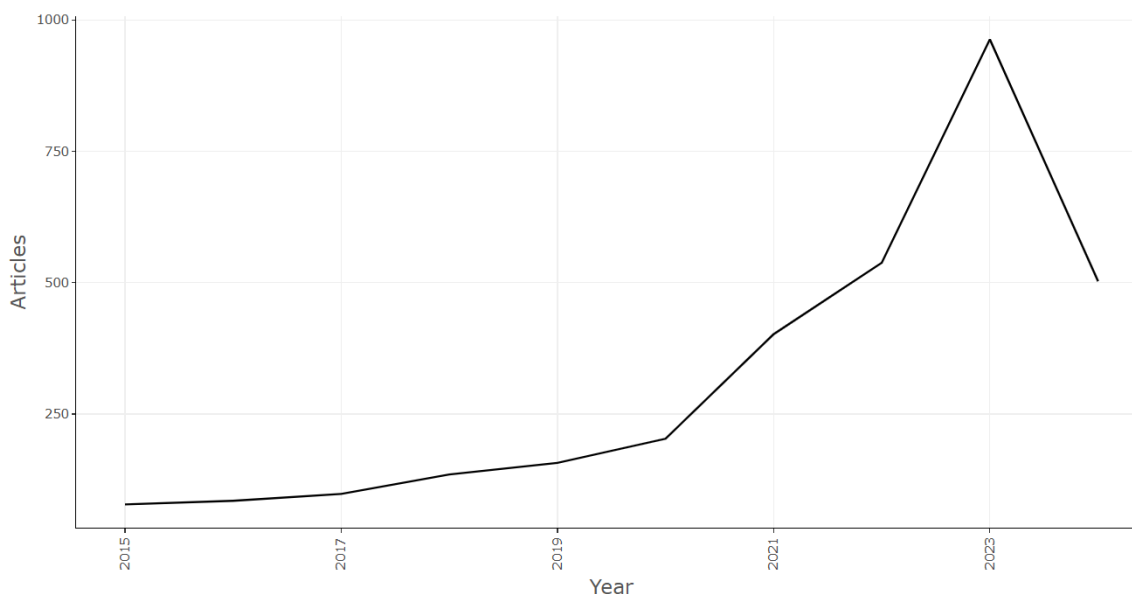


Figure 1 Shows Annual Scientific Production of Bibliometric Research

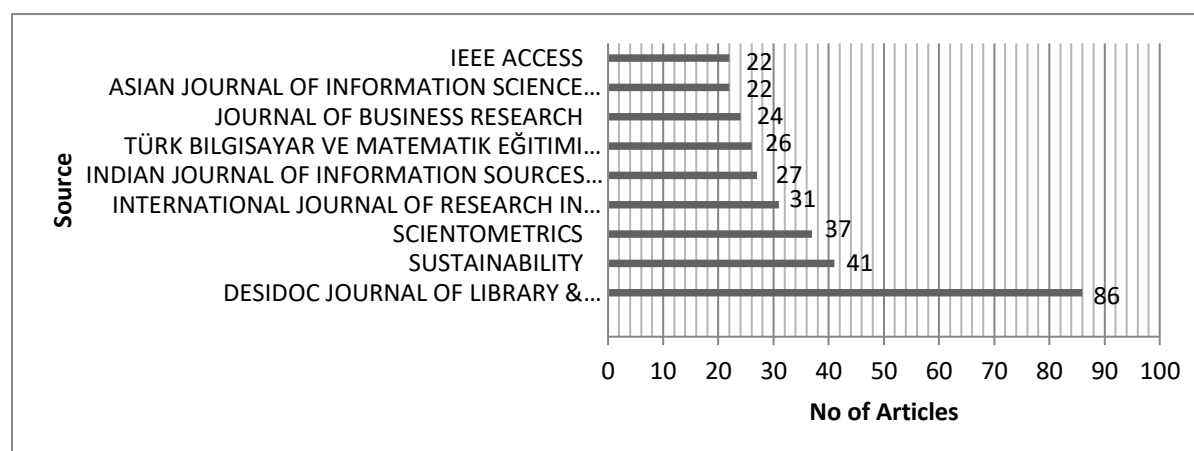


Figure 2 Shows Most Relevant Sources of Bibliometric Research

5.3. Most Relevant Affiliation of Bibliometric Research in India 2015-2024

Symbiosis International University, India, leads with 127 articles, followed closely by Chandigarh University with 125 articles. Malaviya National Institute of Technology Jaipur has contributed 94 articles, while the University of Delhi has produced 87 articles. Other notable institutions include Vellore Institute of Technology University with 71 articles, the National Institute

of Science, Technology, and Development Studies with 69, and Lovely Professional University with 57. O.P. Jindal Global University has 44 articles, Banaras Hindu University has 38, and the Indian Institute of Technology Delhi has produced 36 articles. Aligarh Muslim University and Amrita Vishwa Vidyapeetham each have 35 articles, Chitkara University has 31, and both Indian Institute of Management Ahmedabad and Pondicherry University have contributed 30 articles.

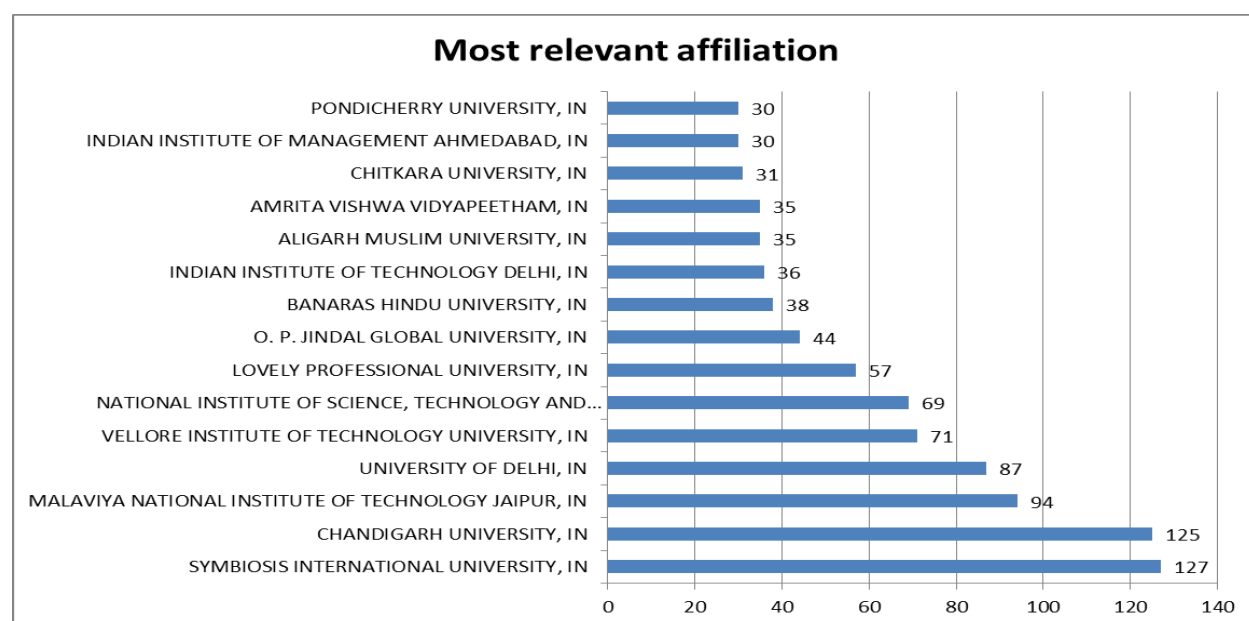


Figure 3 Shows Most Relevant Affiliation of Bibliometric Research in India

5.4. Trend Topics of Bibliometric Research in India 2015-2024

The trend topics of bibliometric research in India from 2015 to 2024 reveal significant insights into the evolving focus areas within the field. The data showcases the frequency of research topics and their temporal distribution, indicating shifts in research priorities and emerging areas of interest.

- 5.4.1. **Global Publications Output:** This topic, with a frequency of 6, saw its primary attention in 2018, with both the first quartile (Q1) and median (Med) years being 2018 and tapering off by 2019. This suggests a concentrated period of interest in global publication metrics within that year.
- 5.4.2. **Artificial Intelligence Research:** Although this topic appeared 5 times, it maintained its initial interest starting in 2018 and continued gaining traction until 2023. This indicates a sustained and growing interest in the intersection of bibliometric research and AI.
- 5.4.3. **Global Research Output:** With a frequency of 9, this topic was primarily researched from 2019, reaching its median focus in 2020 and extending to 2023. This trend reflects an ongoing emphasis on understanding global research outputs and their implications.
- 5.4.4. **Information Science Research:** This topic, appearing 8 times, began gaining attention in 2018, peaked around 2020, and remained relevant

until 2022. This highlights a consistent interest in information science within bibliometric studies.

- 5.4.5. **Supply Chain Management:** A highly frequent topic with 23 occurrences, it was prominently researched from 2022 to 2023, reflecting its relevance in contemporary bibliometric studies, possibly driven by global supply chain challenges.
- 5.4.6. **Corporate Social Responsibility:** With a frequency of 18, this topic gained traction in 2022 and extended its relevance into 2024, highlighting the increasing importance of CSR in the research landscape.
- 5.4.7. **Sustainable Supply Chain:** Appearing 7 times, this topic saw its research focus from 2021 to 2022, indicating a growing concern with sustainability issues within supply chain management.
- 5.4.8. **Systematic Literature Review:** The most frequent topic with 100 occurrences, it became highly relevant in 2022 and maintained its importance through 2023. This indicates a robust methodological focus within the field.
- 5.4.9. **Comprehensive Bibliometric Analysis:** This topic, with a frequency of 10, emerged prominently in 2023 and is projected to maintain its relevance through 2024, indicating a recent but strong focus on comprehensive analytical approaches in bibliometric studies

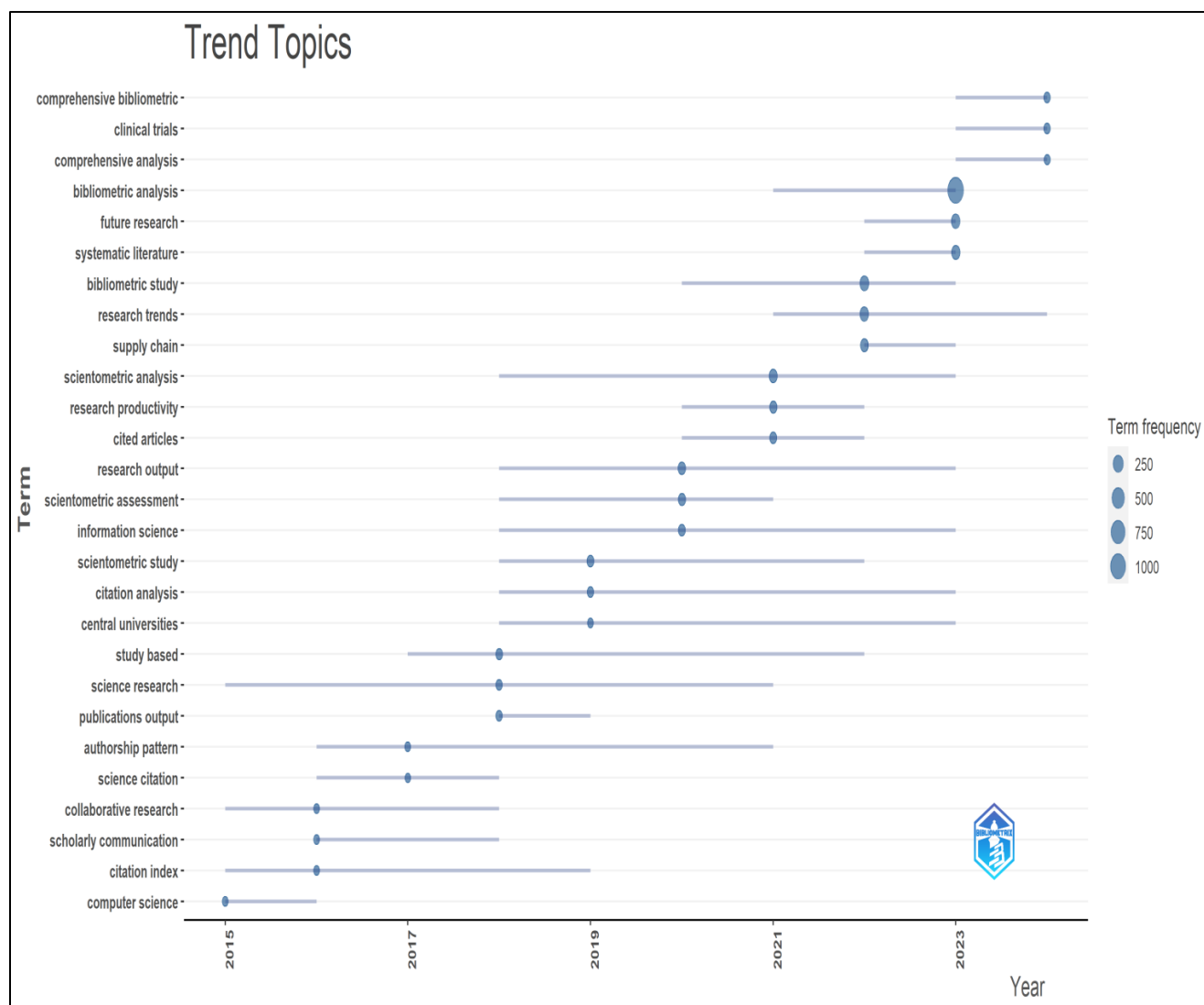


Figure 4 Shows Trend Topics of Bibliometric Research in India

6. Collaboration Network of Bibliometric Research in India 2015-2024

The collaboration network of bibliometric research in India from 2015 to 2024 reveals several key institutions playing pivotal roles. Symbiosis International University and O. P. Jindal Global University, both part of Cluster 1, exhibit significant influence within the network, O. P. Jindal Global University stands out with high betweenness centrality (156.1817539), closeness centrality (0.012987013), and PageRank (0.058166613), highlighting its critical role in facilitating research collaborations. Similarly, the

University of Delhi, part of Cluster 2, shows a high betweenness centrality (219.6180163) and closeness centrality (0.013333333), underscoring its importance. The National Institute of Science, Technology and Development Studies, in Cluster 3, also demonstrate a strong influence with a betweenness centrality of 138.4061953 and a PageRank of 0.055666412. Other notable institutions include Indian Institute of Technology Delhi, Manipal Academy of Higher Education, and Graphic Era University, all within Cluster 1. Jawaharlal Nehru University, part of Cluster 2, also contributes significantly to the network.

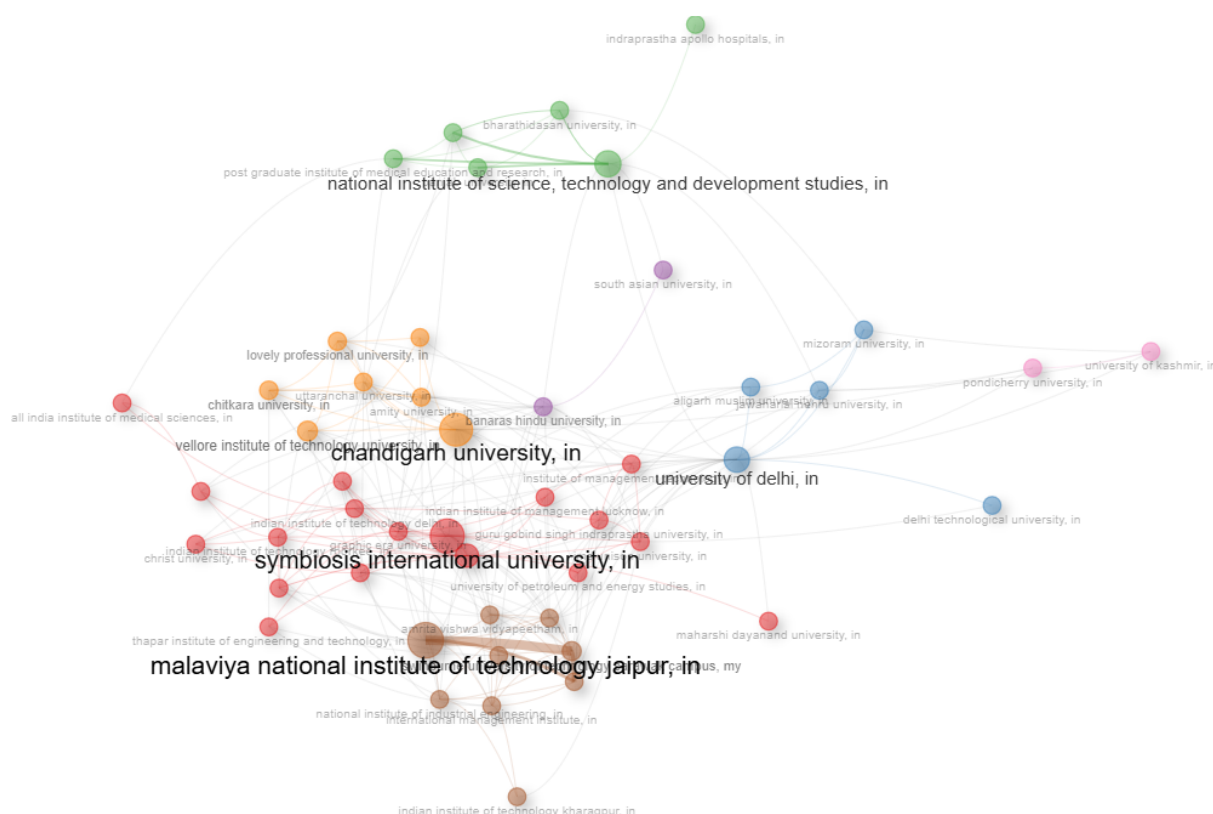


Figure 5 Shows Collaboration Network of Bibliometric Research in India

7. Discussion:

7.1. Annual Scientific Production of Bibliometric Research 2015-2024

The annual scientific production of bibliometric research in India from 2015 to 2024 has shown a notable increase. The number of articles published each year grew gradually from 78 in 2015 to 203 in 2020, indicating a steady rise in research activity. A significant surge occurred in 2021, with the number of articles almost doubling from the previous year to 402, followed by further increases to 538 articles in 2022 and peaking at 963 articles in 2023. This rapid expansion suggests heightened research activity, possibly due to increased funding, interest, or new policies and incentives. However, in 2024, the number of articles dropped to 503, indicating a decline after

the peak in 2023. This decrease could suggest a saturation point, changing research priorities, or external factors impacting research output. Overall, the data reflects a notable upward trend in bibliometric research in India, with significant fluctuations in recent years.

7.2. Most Relevant Sources of Bibliometric Research in India 2015-2024

The analysis of the most relevant sources for bibliometric research in India from 2015 to 2024 highlights the diversity of journals contributing to the field. The top source, unspecified in the data, has 228 articles. The DESIDOC Journal of Library & Information Technology is the second most significant source with 46 articles. Sustainability follows with 41 articles. Another entry for the DESIDOC Journal of Library and Information Technology appears with 40 articles,

possibly indicating a variation in the name of the source. Scientometrics has contributed 37 articles to the field. Other notable sources include the International Journal of Research in Library Science (31 articles), Indian Journal of Information Sources and Services (27 articles), TÜRK BILGISAYAR VE MATEMATİK EĞİTİMİ DERGİSİ (26 articles), Journal of Business Research (24 articles), and Asian Journal of Information Science and Technology (22 articles). This distribution shows that bibliometric research in India is disseminated through a variety of specialized and interdisciplinary journals, with certain journals contributing significantly more articles than others.

7.3. Most Relevant Affiliation of Bibliometric Research in India 2015-2024

The analysis of the most relevant affiliations for bibliometric research in India from 2015 to 2024 identifies key institutions that have significantly contributed to the field. The Malaviya National Institute of Technology Jaipur leads with 94 articles, followed by Chandigarh University with 86 articles. Symbiosis International University has a notable presence with two entries: one with 72 articles and another with 55 articles, suggesting a significant contribution from this institution. The National Institute of Science, Technology and Development Studies has published 69 articles, while the University of Delhi also appears twice, with 63 and 24 articles. O. P. Jindal Global University and Vellore Institute of Technology University both have 44 articles, indicating their substantial involvement in bibliometric research. Other significant contributors include Banaras Hindu University (38 articles), the Indian Institute of Technology Delhi (36 articles), Aligarh Muslim University and Amrita Vishwa Vidyapeetham (both with 35 articles), and Lovely Professional University, which appears twice with 33 and 24 articles. Additional institutions contributing between 24 and 31 articles include

Chitkara University, the Indian Institute of Management Ahmedabad, Pondicherry University, the Manipal Academy of Higher Education, Amity University, the Institute of Management Technology, and Jawaharlal Nehru University. This distribution highlights the diverse range of institutions actively engaged in bibliometric research in India, with a mix of technological institutes, universities, and specialized research institutions contributing significantly to the field.

7.4. Trend Topics of Bibliometric Research in India 2015-2024

The analysis of trend topics reveals that certain themes have consistently gained attention over the years, with some peaking more recently. Topics like systematic literature review, future research agenda, and future research directions show high frequencies, reflecting their importance and relevance in recent years (2022-2024). Other topics like artificial intelligence research and global research output have had sustained interest, with notable peaks in 2023. The consistent interest in supply chain management and corporate social responsibility suggests these areas are particularly pertinent in the context of bibliometric research in India. This data suggests a keen focus on methodological advancements and forward-looking research directions, aligning with global trends in bibliometric studies.

7.5. Collaboration Network of Bibliometric Research in India 2015-2024

The collaboration network analysis highlights the pivotal roles of several key institutions in facilitating research collaborations in India. Symbiosis International University and O. P. Jindal Global University, both part of Cluster 1, exhibit significant influence within the network. O. P. Jindal Global University stands out with high betweenness centrality (156.1817539),

closeness centrality (0.012987013), and PageRank (0.058166613), highlighting its critical role in facilitating research collaborations. Similarly, the University of Delhi, part of Cluster 2, shows a high betweenness centrality (219.6180163) and closeness centrality (0.013333333), underscoring its importance. The National Institute of Science, Technology and Development Studies, in Cluster 3, also demonstrates a strong influence with a betweenness centrality of 138.4061953 and a PageRank of 0.055666412. Other notable institutions include the Indian Institute of Technology Delhi, Manipal Academy of Higher Education, and Graphic Era University, all within Cluster 1. Jawaharlal Nehru University, part of Cluster 2, also contributes significantly to the network. These metrics—betweenness, closeness, and PageRank—highlight the critical and influential positions these institutions hold in India's bibliometric research landscape, facilitating and driving significant research collaborations.

8. Conclusion

The bibliometric research landscape in India from 2015 to 2024 demonstrates a dynamic and evolving field characterized by both rapid growth and significant fluctuations. The data reveals a clear upward trend in annual scientific production, with a notable surge peaking in 2023, followed by a decline in 2024. This pattern suggests a period of heightened research activity influenced by various factors such as increased funding, evolving policies, and changing priorities.

The diversity in sources and affiliations underscores a broad and active engagement across a wide range of journals and institutions. Notably, while some journals consistently contribute a significant volume of articles, the presence of multiple journals indicates a healthy distribution of research output. Similarly, the involvement of diverse institutions, from technological institutes

to universities, reflects a robust and collaborative research environment.

Trend topics indicate a focus on methodological advancements and emerging areas such as artificial intelligence and future research directions. The sustained interest in topics like supply chain management and corporate social responsibility further highlights the relevance of these themes in the context of Indian bibliometric research.

The collaboration network analysis reveals key institutions that play pivotal roles in facilitating research collaborations. Institutions like O. P. Jindal Global University and the University of Delhi stand out for their central positions in the network, driving significant research interactions and collaborations.

The bibliometric research landscape in India reflects a vibrant and evolving field with a strong foundation in diverse research sources, significant institutional contributions, and a focus on contemporary and forward-looking research topics. The observed trends and patterns provide valuable insights into the growth and dynamics of bibliometric research in India over the past decade.

References:

- Garg, K. C., Lamba, M., & Singh, R. K. (1992). *Bibliometric Analysis of Papers Published During 1992-2019 in DESIDOC Journal of Library and Information Technology*. 40(6). <https://www.drdo.gov.in/drdo/sites/default/files/inline-files/15741-Article%20Text-55305-1-10-20201203.pdf>
- Goodwin, J., & Garfield, E. (1980). Citation Indexing- Its Theory and Application in Science, Technology, and Humanities. *Technology and Culture*, 21(4), 714. <https://doi.org/10.2307/3104125>

- Gupta, B. M., & Dhawan, S. M. (2009). Status of India in science and technology as reflected in its publication output in the Scopus international database, 1996–2006. *Scientometrics*, 80(2), 473–490. <https://doi.org/10.1007/s11192-008-2083-y>
- Gupta, B.M. (2014). Indian Contribution in Scientometrics. *DESIDOC Journal of Library and Information Technology*, 34 (3), 187-189
- Gupta, B. M., Lal, K., & Zainab, A. N. (2002). *India's collaboration in science and technology with South East Asian countries*. 7(2), 69–86. <https://core.ac.uk/reader/162015050>
- Keshri, V. R., & Tigga, N. S. (2020). Where there is no research: A bibliometric analysis of health research output from the resource-constrained Bihar state of India. *Journal of Global Health Reports*, 4, e2020086. <https://doi.org/10.29392/001c.16633>
- Kumar, S., & Garg, K. C. (2005). Scientometrics of computer science research in India and China. *Scientometrics*, 64(2), 121–132. https://ideas.repec.org/a/spr/scient/v64y2005i2d10.1007_s11192-005-0244-9.html
- Mondal, D. (2020). Scientometric Assessment of Indian Scientists' Contribution to Selected Physical Review Journals during 2004-2018. *Journal of Scientometric Research*, 9(2), 146–153. <https://doi.org/10.5530/jscires.9.2.18>
- Mondal, H. (2021). BIBLIOMETRICS APPROACH ON LIBRARY AND INFORMATION SCIENCE IN 21 ST CENTURY. In *Handbook of Metric Studies for Library and Information Science Scholars* (1st ed., pp. 10–22). S.K. Research group of companies. https://www.researchgate.net/publication/351065457_BIBLIOMETRICS_APPROACH_ON_LIBRARY_AND_INFORMATION_SCIENCE_IN_21_ST_CENTURY
- Pradhan, B., & Sahu, S. C. (2018). Bibliometric Analysis of Research Publications of Indian Institute of Technology (IIT's) Based on Published Literature as Reflected in Scopus. *Journal of Information and Knowledge*, 292–298. <https://doi.org/10.17821/srels/2018/v55i5/123101>
- Thelwell, M. (2008). Bibliometrics to webometrics. *Journal of Information Science*, 34(4), 605-621. Doi: **10.1177/0165551507087238**

Contributors

Hafijull Mondal

PhD Research Scholar, DLIS, Netaji Subhas Open University, Kolkata, West Bengal, India.
Email: hafijullmondal@gmail.com

Sujay Kumar Das

Library Professional Trainee, Central Library, IIT Kharagpur, West Bengal, India.
Email: bubundas.ugb@gmail.com